BULLETIN 2005 - 08 **Date: March 11, 2005**

U.S. Department of Labor Employment and Training Administration Office of Apprenticeship Training, Employer and Labor Services (OATELS) Washington, D.C. 20210	Distribution: A-541 Headquarters A-546 All Field Tech A-547 SD+RD+SAC+; Lab.Com	Subject: New Apprenticeable Occupation - Geospatial Specialist Code: 200
Symbols: DSNIP/CFV		Action: Immediate

PURPOSE: To inform the Office of Apprenticeship Training, Employer and Labor Services (OATELS), Bureau of Apprenticeship and Training (BAT) Staff of a new apprenticeable occupation:

Geospatial Specialist
RAIS Code: 1062
O*NET Code: 17-1021.00
Training Term: 2,000 hours - 4,000 hours
Type of Training: Competency - based

BACKGROUND: State Director Dennis Goodson on behalf of the Geospatial Technology Apprenticeship Program (GTAP) Committee initiated the apprenticeability request for this occupation.

The "Geospatial Specialist" is the basic apprenticeship for the purpose of developing geospatial workers. The objectives of the specialist program are: 1) to provide employers with a vehicle to obtain high value geospatial workers and 2) to ensure that geospatial apprentices can obtain employment.

Geospatial workers receiving the Geospatial Specialist credential will:

- possess adequate depth of geospatial knowledge and skills required to solve problems and successfully perform work in specific geospatial job roles,
- possess adequate breadth of general geospatial knowledge and skills required to understand problems and escalate issues to the appropriate specialists, and
- possess adequate general geospatial knowledge and skills to advance into specialization areas (concentrations) in geospatial, based upon the particular needs of the geospatial employer and the career aspirations of the worker.

The specific requirements for completing the Geospatial Specialist concentration are:

1) 2,000 hours of competency based on-the-job learning through an approved program employer/sponsor, and

2) 280 hrs of Geospatial technical training as defined in the related instruction outline.

ACTION:

All OATELS staff should review and retain a copy of this bulletin, including all attachments, as a source for developing apprenticeship standards and/or providing technical assistance.

Attachments

WORK PROCESSES
Geospatial Specialist
O*NET Code: 17-1021.00 RAIS Code: 1062

Geospatial Technology Competency Model (GTCM) specifies the Core Competency Definitions and Minimum and Maximum Hours Required for Successful Training of the Geospatial Specialist Occupation. (*Allowing for multiple exit and entry points based on the individual apprentice and the employer's needs*).

The (GTCM) will be used as the foundational building block upon which to train and develop the Geospatial Specialist. There are twelve (12) work roles that are inclusive in the fifteen (15) "core competencies" designated because they cut across all twelve work roles identified in the GTCM. The core competencies are the defining structure for the Geospatial Specialist. In the GTCM format competencies are the key areas of knowledge and skill that enable the apprentice to perform. A total of thirty-nine (39) competencies are identified for the geospatial industry in the GTCM. The GTCM is an output – driven competency based apprenticeship program. Work Processes are defined by roles and supported by specific competencies required for each role; yet each work role has unique outputs, products, services, and information that are essential for geospatial technology work.

The business needs of the employer/sponsors determine the outputs or key deliverables needed from the apprentice. However, it is a requirement of GTCM that all apprentice training, On-the-Job Learning (OJL), and/or related instruction encompass expertise in the 15 core competencies and a working knowledge of all 39 Geospatial Technology competencies. The number of OJL hours required depends on the associated competencies and outputs for the roles specified by the Employer for their organization. A minimum number of OJL hours should not be less than 2,000 hours; the distribution of role OJL hours is shown on the following list of Work Processes. The maximum term of apprenticeship will consist of 4,000 hours of OJL over a period of 24 consecutive months. The distribution of maximum term of hours is also shown on the following Work Process list. While this program represents a standardized program of OJL and related instruction over a period of 24 consecutive months and 4,000 hours, the flexibility of a competency-based program provides the needed cross-functional training and experience this high growth industry requires. Each employer will identify the outputs for the individual Apprentice's Competency Development Plan, the total of which will not be less than that required for a Certificate of Completion of Apprenticeship (i.e., 2,000 hours or 12 months). These outputs are based on the specific needs of the employer/sponsor and mapped to the GTCM core competencies.

Employers will select outputs that include all 15 of the GTCM core competencies. Upon completion of the Apprentice's Competency Development Plan that includes all 15 GTCM core competencies and their required level of expertise, and a working knowledge of the 39 GTCM competencies, the sponsor will request the Certificate of Completion of Apprenticeship.

The total number of hours required for successful completion for any single apprentice is: organizational specific, role specific, and competency specific. While this program represents a standardized program of OJL and related instruction, the flexibility of a competency-based program provides the needed cross-functional training and experience this high growth industry requires. Listed below are role definitions for the GTCM, and the total number of hours required for one (apprentice) to develop the competencies in each role. Hours are a guide to completion of the qualification cards.

Table 1 OUTLINE OF ON-THE-JOB LEARNING (OJL)

WORK PROCESSES		HOURS	
(ROLES)		MINIMUM	MAXIMUM
Application Development	The role of identifying and developing tools and instruments to satisfy customer needs.	**130**	**294**
Coordination	The role of inter-organizational facilitation and communication.	**188**	**376**
Data Acquisition	The role of collecting geospatial and related data.	**72**	**196**
Data Analysis and Interpretation	The role of processing data and extracting information to create products, drive conclusions, and inform decision-making reports.	**116**	**310**
Data Management	The role of cataloging, retrieving and distributing geospatial data.	**144**	**196**
Management	The role of efficiently and effectively applying the company's mission using financial, technical and intellectual skills and resources to optimize the end-products.	**218**	**457**
Marketing	The role of identifying customer requirements and needs and effectively communicating those needs and requirements to the organization, as well as promoting geospatial solutions.	**188**	**278**
Project Management	The role of effectively overseeing activity requirements to produce the desired outcomes on time and within budget.	**174**	**294**
Systems Analysis	The role of assessing requirements for system capacities including inputs, outputs, processes, timing and performance, as well as recommending necessary additions or adaptations.	**174**	**294**
Systems Management	The role of integrating resources and developing additional resources to support spatial & temporal user requirements.	**218**	**424**
Training	The role of analyzing, designing, and developing instructional and non-instructional interventions to provide transfer of knowledge and evaluation for performance improvement.	**218**	**473**
Visualization	The role of rendering data and information into visual geospatial representations.	**160**	**408**
TOTAL HOURS		**2000**	**4000**

RELATED INSTRUCTION

Table 2 below outlines the minimum guidelines for credit hours and/or training clock hours required for the core related instruction by subject. Official college/university transcripts are required to verify credit hours and certificates of completion are required to verify hours of classroom/online training (copies are sufficient).

Table 2 MINIMUM GUIDELINES FOR CREDIT HOURS/TRAINING HOURS

Core Related Instruction Subject	**Community College or University Credit (semester credit hours)**	**Training - Online Learning or Classroom (hours of instruction)**
Fundamentals of GIS	3	40
Fundamentals of GIS Software	3	40
Fundamentals of Remote Sensing	3	40
Fundamentals of Database	3	40
Fundamentals of Cartography	3	40
Total Core Credit/Hours	**15**	**200**

Up to 9 credit hours and/or 120 training hours may be satisfied by previous on-the-job experience and demonstration of outputs related to the course(s). This advanced standing must be submitted by the Employer and the Apprentice for approval by the GTAP Committee.

Table 3 below outlines the minimum guidelines for credit hours and/or training clock hours required for the elective related instruction based on individual Apprentice Competency Plans. Official college/university transcripts are required to verify credit hours and certificates of completion are required to verify hours of classroom/online training (copies are sufficient).

Table 3 MINIMUM GUIDELINES FOR CREDIT HOURS/TRAINING HOURS

Electives	**Community College or University Credit (semester credit hours)**	**Training - Online Learning or Classroom (hours of instruction)**
Based on Competency Development Plan	3	40
Based on Competency Development Plan	3	40
Total Elective Credit/Hours	**6**	**80**

Up to 3 credit hours and/or 40 training hours may be satisfied by previous on-the-job experience and demonstration of outputs related to the course(s). This advanced standing must be submitted by the Employer and the Apprentice for approval by the GTAP Committee.

CORE RELATED INSTRUCTION SUBJECT/COURSE DESCRIPTIONS

Fundamentals of GIS - Includes the use of computer mapping and database in multiple applications. Included are incorporation of imagery and data into a graphical oriented database system. Also included are the fundamentals of Geographical Information Systems (GIS) techniques, approaches, and applications.

Fundamentals of GIS Software - The foundation for developing a geographic information system using ArcView software. The course gives students the conceptual overview and hands-on experience needed to take full advantage of ArcView software's display analysis, and presentation mapping functions. Students learn basic ArcView functionality and become familiar with the components of the ArcView graphical user interface (GUI).

Fundamentals of Remote Sensing - Includes a discussion of a variety of remote sensing data collections methods. The course deals with manual interpretation data from photographs and other imagery.

Fundamentals of Database - A course designed to database concepts and goals of database management systems, and relational, hierarchical, and network models of data. Included are Structured Query Language (SQL) and methods of organizing and accessing data.

Fundamentals of Cartography - An introduction to the preparation and interpretation of data in cartographic form and the use of computers for map compilation, design, and production. This includes principles of global positioning (GPS), methods of map making, and principles of digital cartography.

POTENTIAL RELATED INSTRUCTION SUBJECT/COURSE ELECTIVES

Data Acquisition in GIS - A course that provides students with the knowledge and practical experience necessary to develop skills in the acquisition, conversion, and creation of spatial data. Topics include acquisition of existing data, metadata, conversion in format of digital data, creating digital data utilizing digitizers and scanners, the utilization of remote sensing data, and the Global Positioning System (GPS).

Principles of Image Processing – Course includes fundamentals of remotely sensed data including scale, feature identification, and symbolization. Topic includes fundamentals of interpretation techniques of various image products, including topographic and thematic maps, aerial photographs, sensor images, and satellite images.

Regional Geography – A course that is a global survey of the world's cultural regions; basic geographic concepts and ideas are used to study and compare people, resources, landscapes, livelihood and economics, and origins across eight major geographic regions. The interaction of countries and regions, their global roles, and the conflicting pressures of cultural diversity versus globalization are presented. The widening gap between more developed and less developed countries is integrated throughout the course. Cultural and ethnic diversity, as it pertains to the expanding population of the United States, is evaluated throughout the course.

Physical Geography – A course that is a laboratory study of basic principles and concepts involved in understanding Earth's physical systems. Units feature observation, measurement, and analysis in energy, weather and climate, vegetation, soils, landforms, and environmental hazards. In addition to computer applications, construction of maps and interpretation of remote sensing data are integral activities.

NOTE: ***Courses can be taken as community college or university credit, or commercially available vendor-based programming. Refer to reference manual for specific curricula*****.**

RELATED INSTRUCTION OUTLINE
Geospatial Specialist

Table 4 below outlines the minimum guidelines for credit hours and/or training contact hours required for the core related instruction by subject. Official college/university transcripts are required to verify credit hours and certificates of completion are required to verify hours of classroom/online training (copies are sufficient).

Method of Delivery: In House Training, Vocational/Technical Institution, Community College Classroom, College/University Classroom, and/or e-Learning.

Source of Instruction: Local education or training providers.

Table 4 MINIMUM GUIDELINES FOR CREDIT HOURS/TRAINING HOURS

Core Related Instruction Subject	Community College or University Credit (semester credit hours)	Training - Online Learning or Classroom (hours of instruction)
Fundamentals of GIS	3	40
Fundamentals of GIS Software	3	40
Fundamentals of Remote Sensing	3	40
Fundamentals of Database	3	40
Fundamentals of Cartography	3	40
Total ITL Core Credit/Hours	**15**	**200**

Up to 9 credit hours and/or 120 training hours may be satisfied by previous on-the-job experience and demonstration of outputs related to the course(s). This waiver must be submitted by the Employer and the Apprentice for approval by the GTAP Committee.

Table 3 below outlines the minimum guidelines for credit hours and/or training contact hours required for the elective related instruction based on individual Apprentice Competency Plans. Official college/university transcripts are required to verify credit hours and certificates of completion are required to verify hours of classroom/online training (copies are sufficient).

Table 3 MINIMUM GUIDELINES FOR CREDIT HOURS/TRAINING HOURS

Electives	Community College or University Credit (semester credit hours)	Training - Online Learning or Classroom (hours of instruction)
Based on Competency Development Plan	3	40
Based on Competency Development Plan	3	40
Total ITL Elective Credit/Hours	**6**	**80**

GEOSPATIAL SPECIALIST ROLES AND TRAINING MATRIX

D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\
D:\ GTAP-Competencies\	D:\ GTAP-Competencies\